

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Applicant's or agent's file reference R9131WO		Date of mailing (day/month/year) See form PCT/ISA/210
FOR FURTHER ACTION See paragraph 2 below		
International application No. PCT/FR2004/000538	International filing date (day/month/year) 05.03.2004	Priority date (day/month/year) 01.09.2003
International Patent Classification (IPC) or both national classification and IPC H04L1/06		
Applicant FRANCE TELECOM		

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP Facsimile No.	Authorized officer Telephone No.
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Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
 a sequence listing
 table(s) related to the sequence listing
 - b. format of material
 in written format
 in computer readable form
 - c. time of filing/furnishing
 contained in the international application as filed.
 filed together with the international application in computer readable form.
 furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement																			
<p>1. Statement</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Novelty (N)</td> <td style="width: 60%;">Claims <u>2, 3, 7, 9, 14, 15, 17</u></td> <td style="width: 25%; text-align: right;">YES</td> </tr> <tr> <td></td> <td>Claims <u>1, 4-6, 8, 10-13, 16</u></td> <td style="text-align: right;">NO</td> </tr> <tr> <td>Inventive step (IS)</td> <td>Claims <u>2, 3, 7, 9, 14, 15, 17</u></td> <td style="text-align: right;">YES</td> </tr> <tr> <td></td> <td>Claims <u>1, 4-6, 8, 10-13, 16</u></td> <td style="text-align: right;">NO</td> </tr> <tr> <td>Industrial applicability (IA)</td> <td>Claims <u>1-17</u></td> <td style="text-align: right;">YES</td> </tr> <tr> <td></td> <td>Claims _____</td> <td style="text-align: right;">NO</td> </tr> </table>			Novelty (N)	Claims <u>2, 3, 7, 9, 14, 15, 17</u>	YES		Claims <u>1, 4-6, 8, 10-13, 16</u>	NO	Inventive step (IS)	Claims <u>2, 3, 7, 9, 14, 15, 17</u>	YES		Claims <u>1, 4-6, 8, 10-13, 16</u>	NO	Industrial applicability (IA)	Claims <u>1-17</u>	YES		Claims _____	NO
Novelty (N)	Claims <u>2, 3, 7, 9, 14, 15, 17</u>	YES																		
	Claims <u>1, 4-6, 8, 10-13, 16</u>	NO																		
Inventive step (IS)	Claims <u>2, 3, 7, 9, 14, 15, 17</u>	YES																		
	Claims <u>1, 4-6, 8, 10-13, 16</u>	NO																		
Industrial applicability (IA)	Claims <u>1-17</u>	YES																		
	Claims _____	NO																		
<p>2. Citations and explanations:</p> <p>Reference is made to the following document:</p> <p>D1: EP-A-1 133 071 (TEXAS INSTRUMENTS INC) 12 September 2001 (2001-09-12)</p> <p>1. The present application fails to comply with the requirements of PCT Article 33 since the subject matter of claims 1,4-6,8,10-13,16 does not meet the requirement of novelty defined in PCT Article 33(2).</p> <p>1.1 Claim 1: Document D1 describes a method of decoding a signal received comprising symbols distributed in space, time and/or in frequency with the aid of a space-time or space-frequency coding matrix (page 6, lines 39-51) in that it implements a step of space-time decoding and at least one iteration each comprising the following sub steps</p> <ul style="list-style-type: none"> - diversity predecoding, the inverse of a diversity precoding implemented on transmission of the said signal, delivering predecoded data (page 5, lines 2-4; page 6, lines 32-36; figure 6a, 8) - estimation of the symbols forming the said signal, on the basis of the said predecoded data, delivering 																				

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

estimated symbols

(page 5, lines 4-8; page 6, lines 32-36; figure 6a, 8)

- diversity precoding, identical to the said diversity precoding implemented during transmission, applied to the said estimated symbols, to provide an estimated signal, except for the last iteration

(page 6, lines 39-51; page 7, lines 1-8; figure 8)

1.2 Claim 16: Document D1 describes a receiver implementing means of decoding a signal received comprising symbols distributed in space, time and/or in frequency with the aid of a space-time or space-frequency coding matrix (page 6, lines 39-51)

characterized in that it comprises means of space-time decoding that is the inverse of the space-time coding implemented on transmission, and:

- means of diversity predecoding of the said optimized signal, performing an inverse predecoding of a diversity precoding implemented on transmission of the said signal, delivering predecoded data

(page 5, lines 2-4; page 6, lines 32-36; figure 6a, 8)

- means of estimation of the symbols forming the said signal, on the basis of the said precoded data, delivering new estimated symbols

(page 5, lines 4-8; page 6, lines 32-36; figure 6a, 8)

- means of diversity precoding, performing a precoding identical to the said diversity precoding implemented during transmission, applied to the said estimated symbols, to provide an estimated signal, except for the last iteration

(page 6, lines 39-51; page 7, lines 1-8; figure 8)

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1.3 Dependent claims 4-6, 8, 10-13 do not appear to contain any additional features which, in combination with the subject matter of any one of the dependent claims, meet the requirements of the EPC in respect of novelty and inventive step.

Document D1 discloses the additional characteristics of dependent claims 4 (page 3, line 52 - page 4, line 1), 5 (page 9, line 21 - page 10, line 5), 6 (page 5, lines 4-8; page 6, lines 32-36; fig. 6a, 8), 8 (page 4, lines 10-12; page 4, lines 21-26), 10, 11 (page 5, lines 4-8; page 6, lines 32-36; fig. 6a, 8), 12 (page 5, lines 16-18; page 6, lines 8-16), 13 (page 5, lines 9-14)

2. The additional characteristics of claims 2, 3, 7, 9, 14, 15, 17 are not disclosed, in their current form, in the documents cited in the search report.

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Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

1. With a view to meeting the requirements of PCT Rule 5.1(a) (ii), it is up to the Applicant to cite in the description document D1 and to indicate the corresponding prior art.
2. Claims 1, 16 and 17 are drafted in two parts. However, the features that they are disclosed in document D1 ought not to appear in the characterizing part (PCT Rule 6.3(b)).
3. Two claims are identified by the same reference number 15. The Applicant is requested to modify the numbering of the claims.
4. The features appearing in the claims do not comprise reference signs between parentheses (PCT Rule 6.2(b)).

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. Although claims 1, 15 (coding and decoding method) and 17 have been drafted in the form of distinct independent claims, it seems that they have the same subject matter and that they differ from one another only through a variation in the definition of the subject matter for which protection is requested and through the terms used to define the features thereof. Consequently these claims are not concise and therefore do not meet the requirements of PCT Article 6.

In order to overcome this objection, it seems appropriate to file a modified set of claims defining the relevant subject matter through a single independent claim in this category (method), followed by dependent claims covering purely optional features.

2. Claims 1 and 16 do not contain the features essential to the definition of the invention.

It emerges clearly from the description that the feature of subtraction from the said equalized signal of the said estimated signal is essential to the definition of the invention.

The independent claims 1 and 16 not containing this feature, do not meet the requirement following from PCT Article 6 taken in combination with PCT Rule 6.3(b) that any independent claim must contain all the technical features essential for the definition of the invention.

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The essential feature of subtraction is disclosed in
claim 2.